

*AIM:* How is the volume of liquids measured?

Pre-test Given

## **VOCABULARY**

- ▣ Graduated cylinder**
- ▣ Meniscus**
- ▣ increment**

# OBJECTIVE

*To successfully measure volume  
of a liquid.*

# DEFINITION

*What is volume ?*

*Volume is the amount of space an object (liquid) takes up.*

# In the United States

*How is volume measured ?*

*Cups, pints quarts, ounces,  
gallons.*

# In the Metric System

*For liquids, the standard (basic) unit of measure for volume is ...*

*Liter*

*Abbreviation L*

*(notice it is a capital letter)*

*Milliliters (mL) are also frequently used*

## In Metric

*1 milliliter (mL) of liquid  
volume*

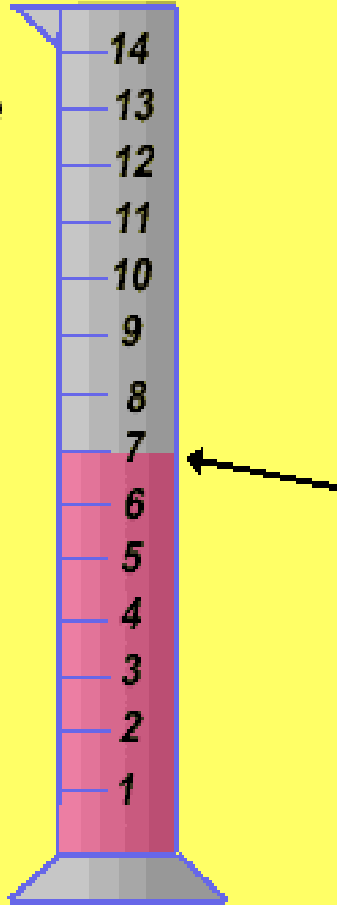
*occupies the same amount of  
space as*

*1 cm<sup>3</sup>*

$$1 \text{ mL} = 1 \text{ cm}^3$$

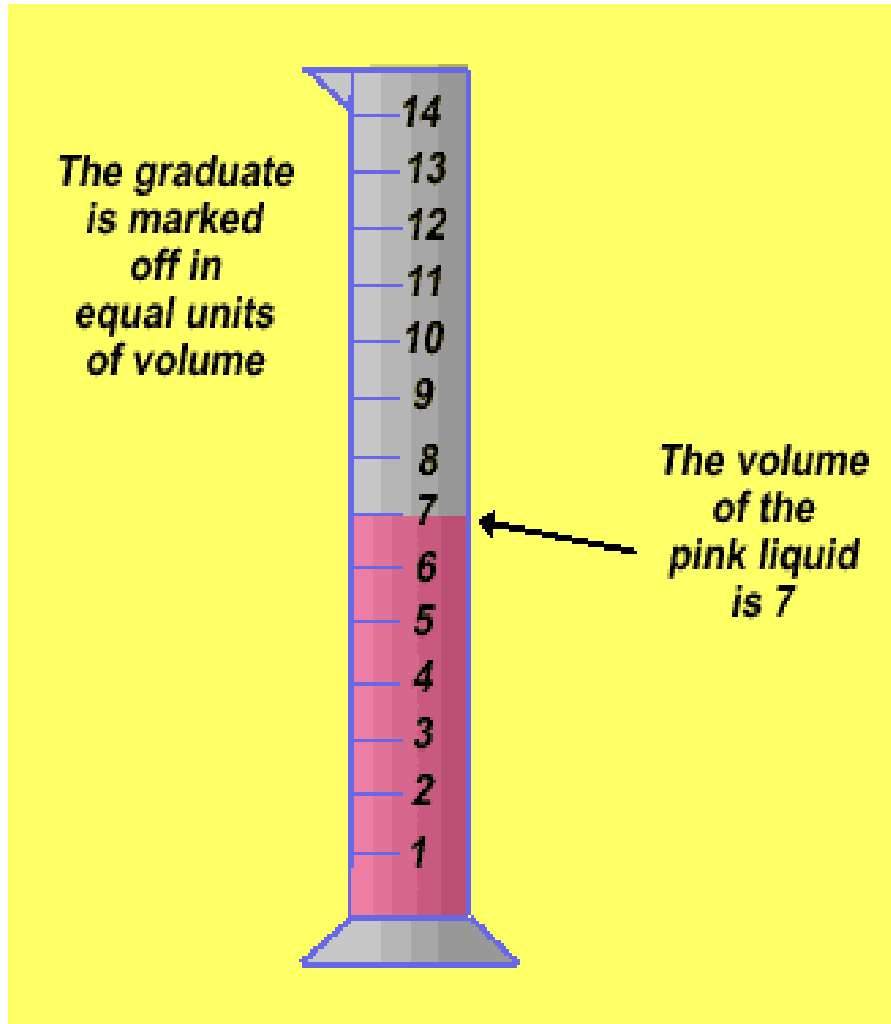
# How do you read a graduated cylinder

The graduate  
is marked  
off in  
equal units  
of volume



- What is the volume of the pink liquid

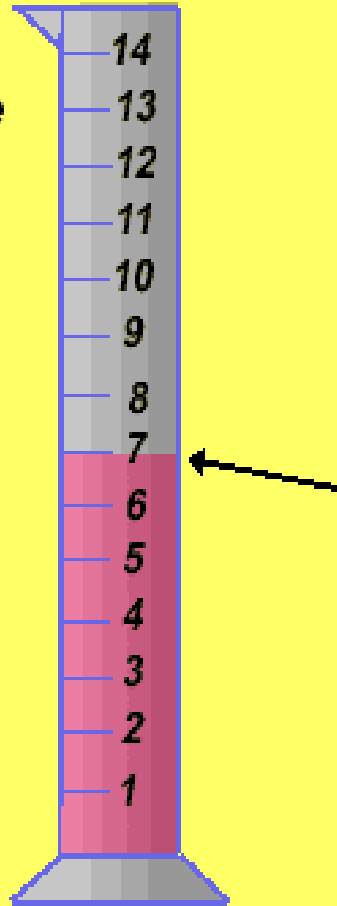
# How do you read a graduated cylinder



Most graduated cylinders are marked off in milliliters!

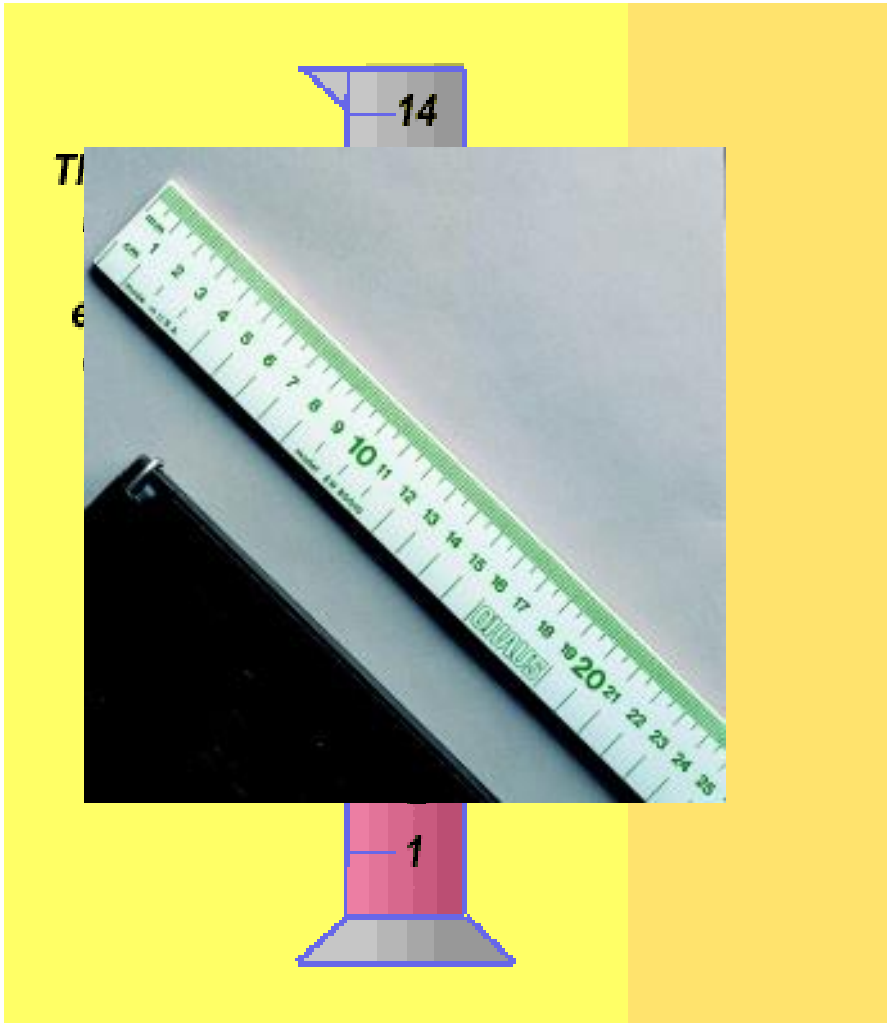


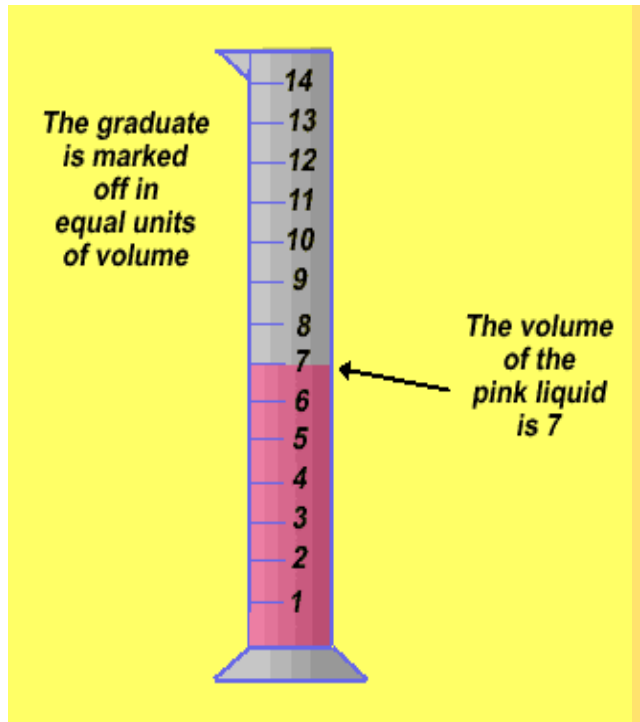
The graduate  
is marked  
off in  
equal units  
of volume



- The graduated cylinder is marked off in equal units
- The equal units are called increments

- What is the smallest increment on a meter stick?



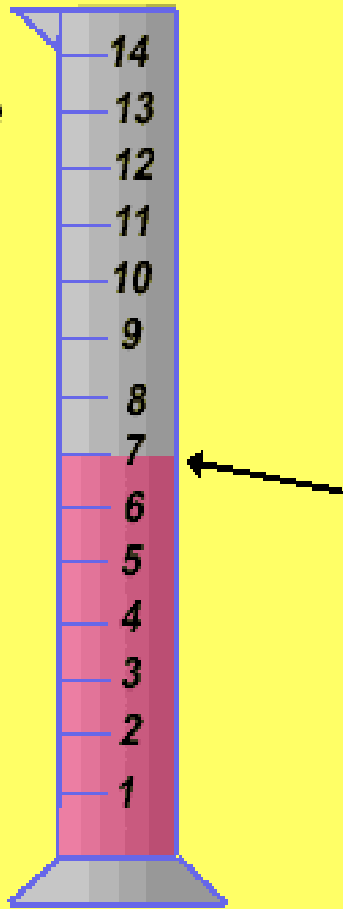


- Although all graduated cylinders have equal increments
- The increments are not the same on different sized graduated cylinders

Each increment is  
**DIFFERENT** on  
different sized  
cylinders

Sometimes the  
increment is 1ml,  
other times its 5ml or  
0.1ml, 0.2 ml, 0.5ml

*The graduate  
is marked  
off in  
equal units  
of volume*



**You have to check!**

# What is the Meniscus?



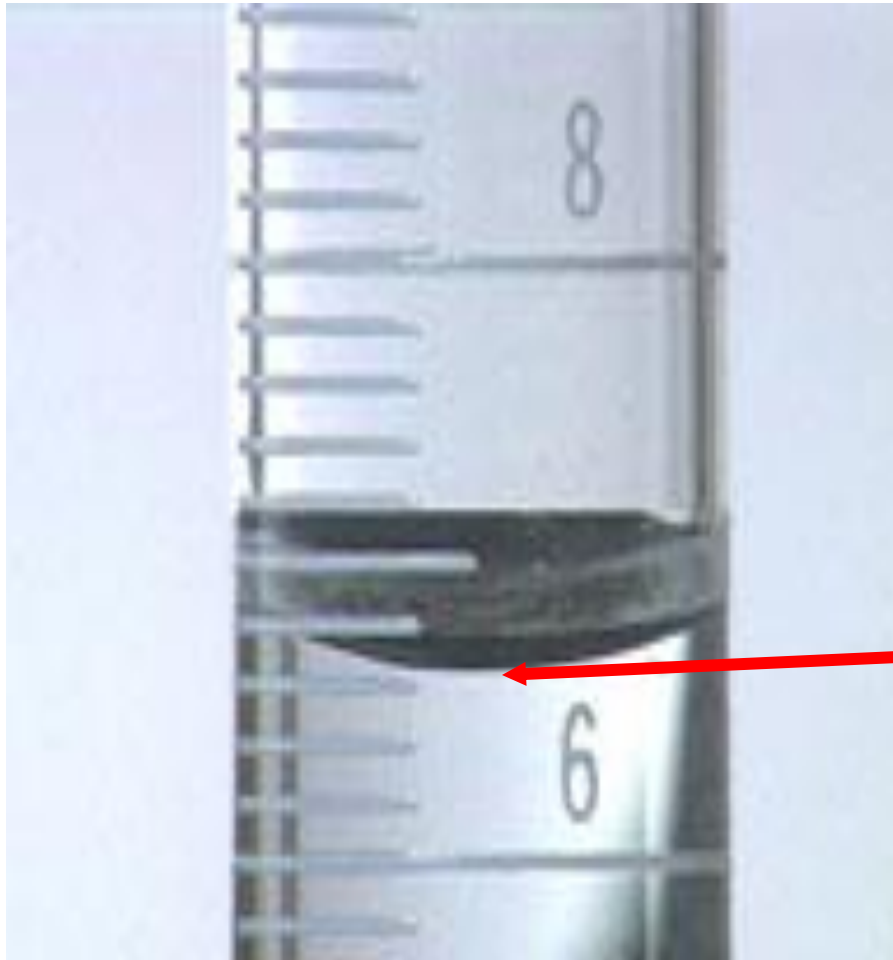
- You have to read the level of the liquid at the meniscus
- What is a meniscus?

# What is the Meniscus?



- The meniscus is the curved “line” that the water forms inside the graduated cylinder

# How is the Meniscus read?



- The meniscus is read from the bottom of the “curve”

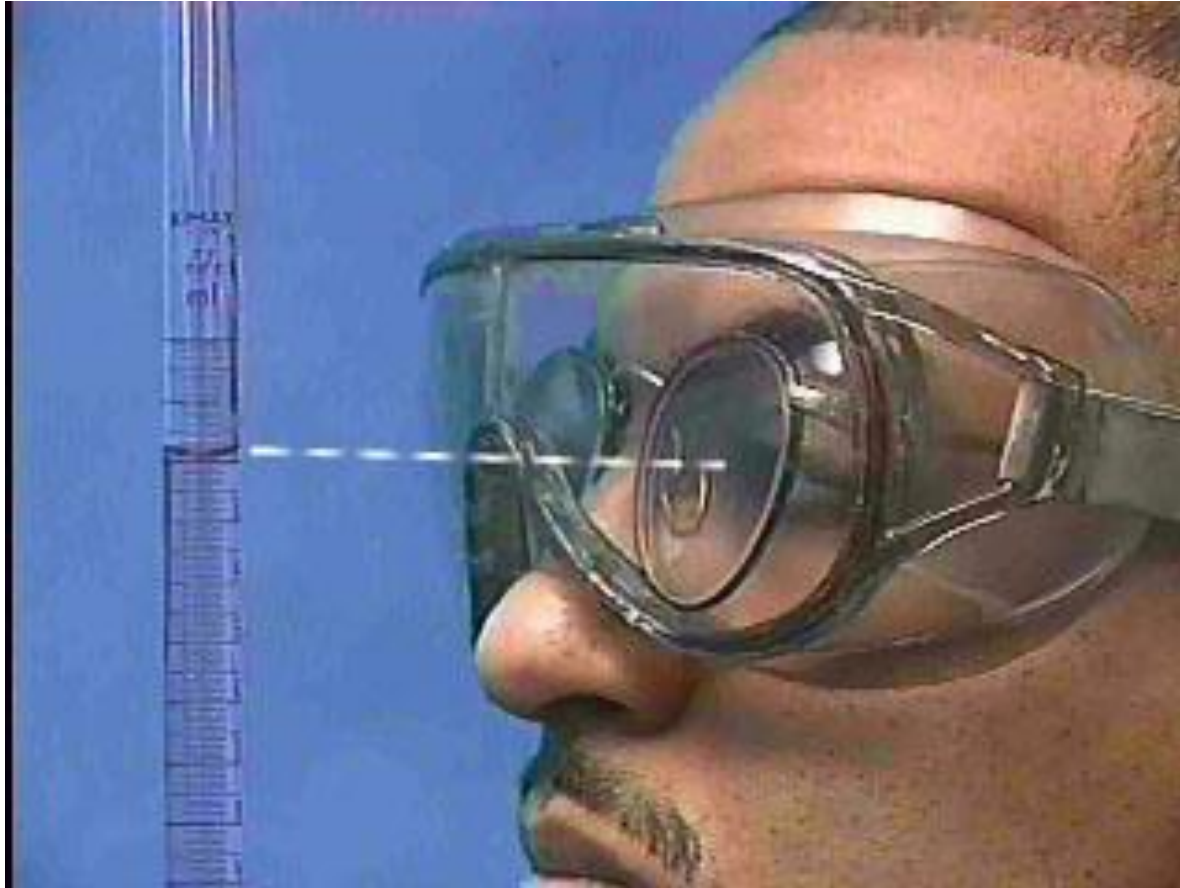
# How to read a Meniscus



1. Flat surface
2. Bend down and read at Eye Level
3. Read the bottom of the meniscus

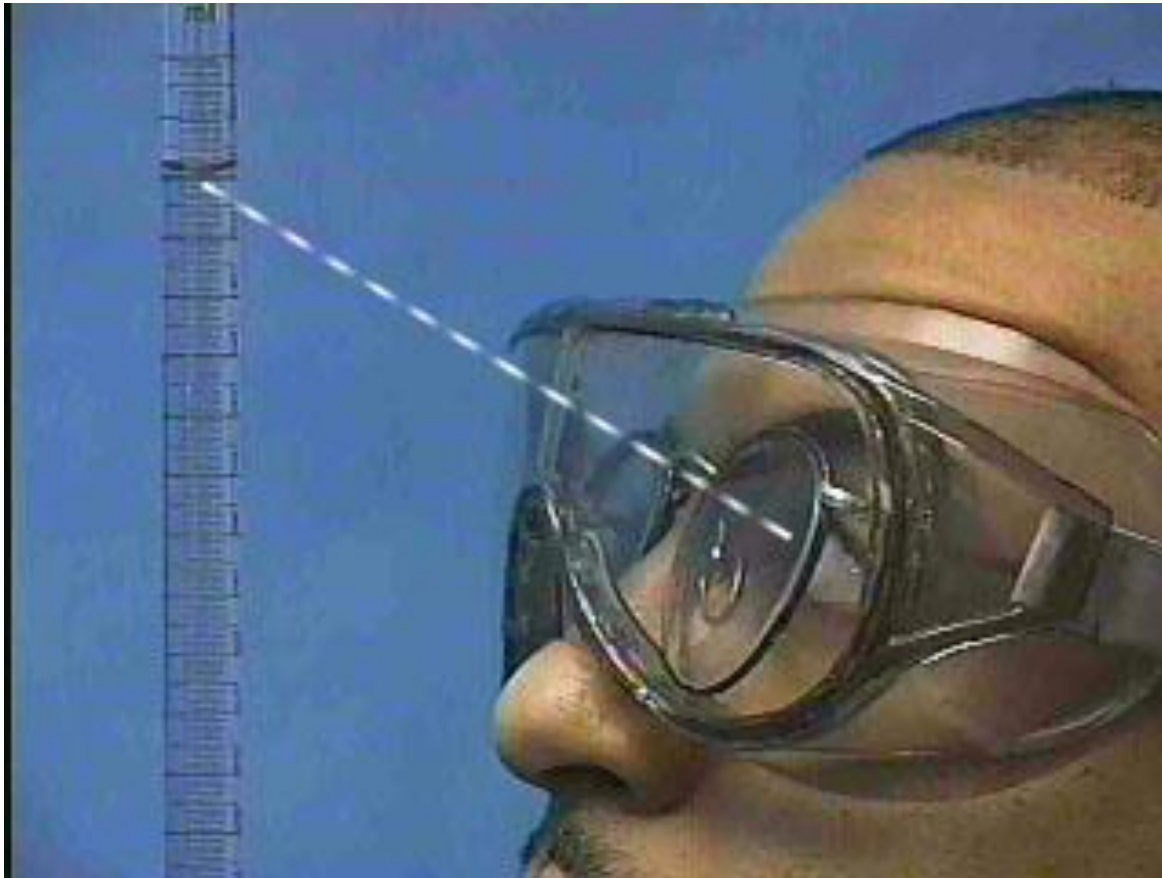


# Lets Practice reading a graduated cylinder:



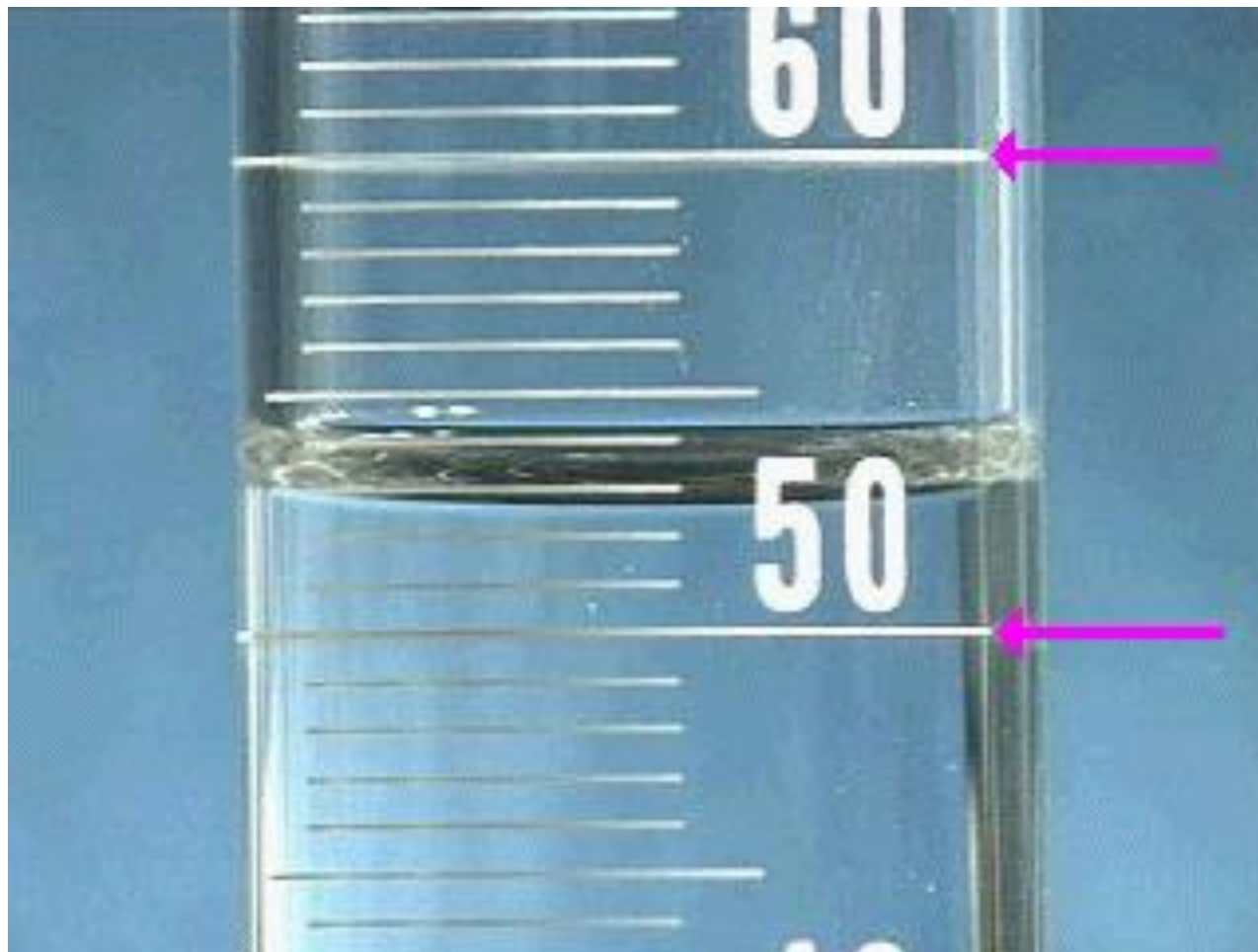
•Correct

Lets Practice reading a graduated cylinder:



•incorrect

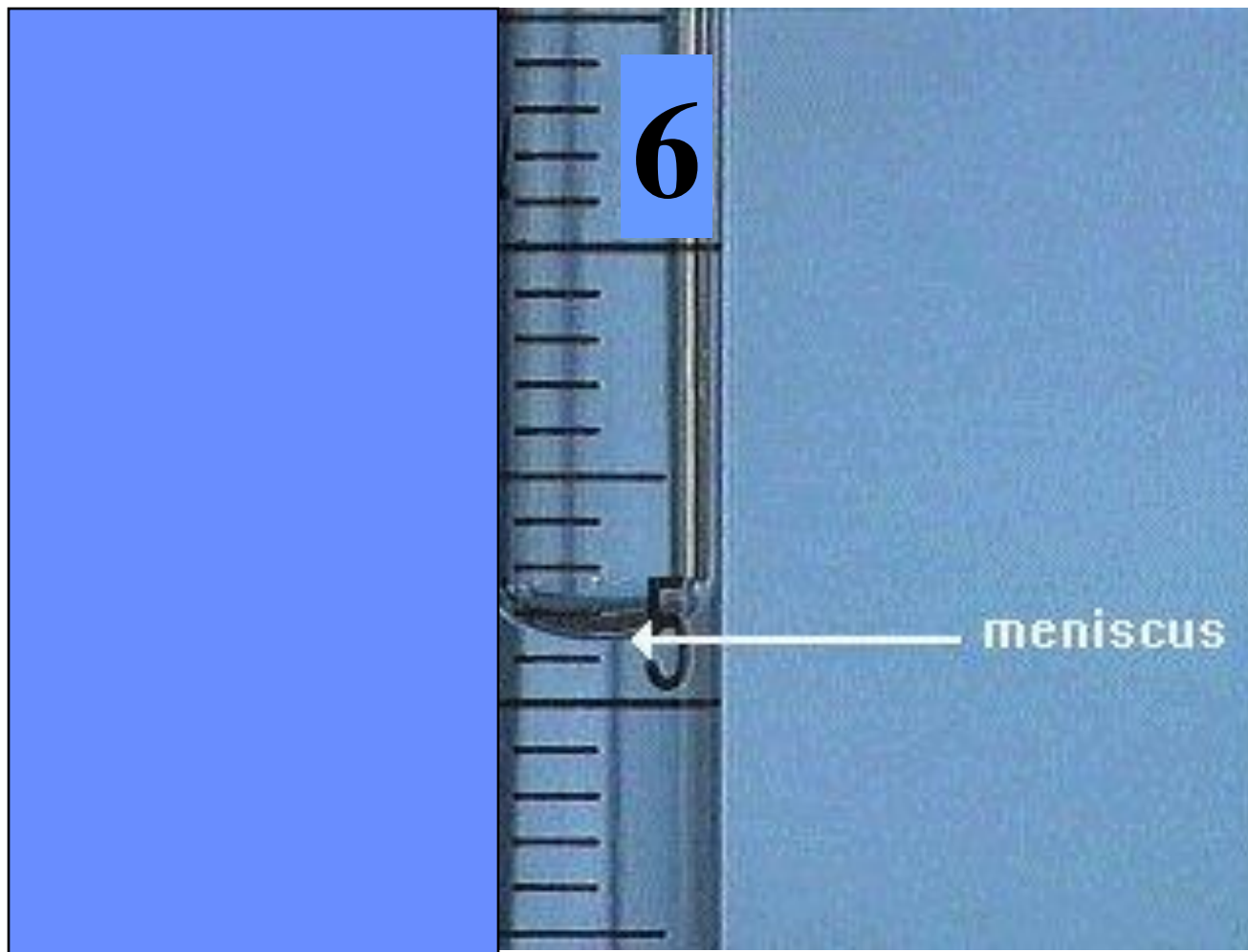
Lets Practice reading a graduated cylinder:



What is the volume here?

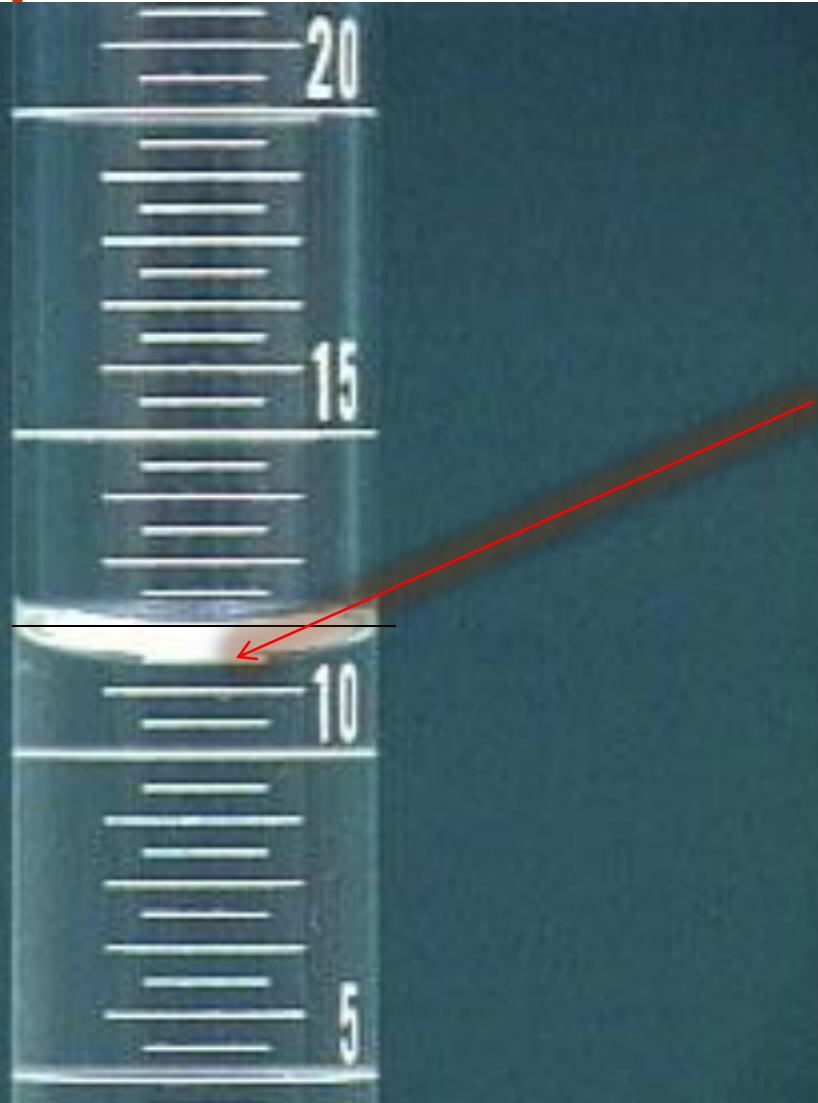
What is the increment?

Lets Practice reading a graduated cylinder:



What is the volume here?

Lets Practice reading a graduated cylinder:

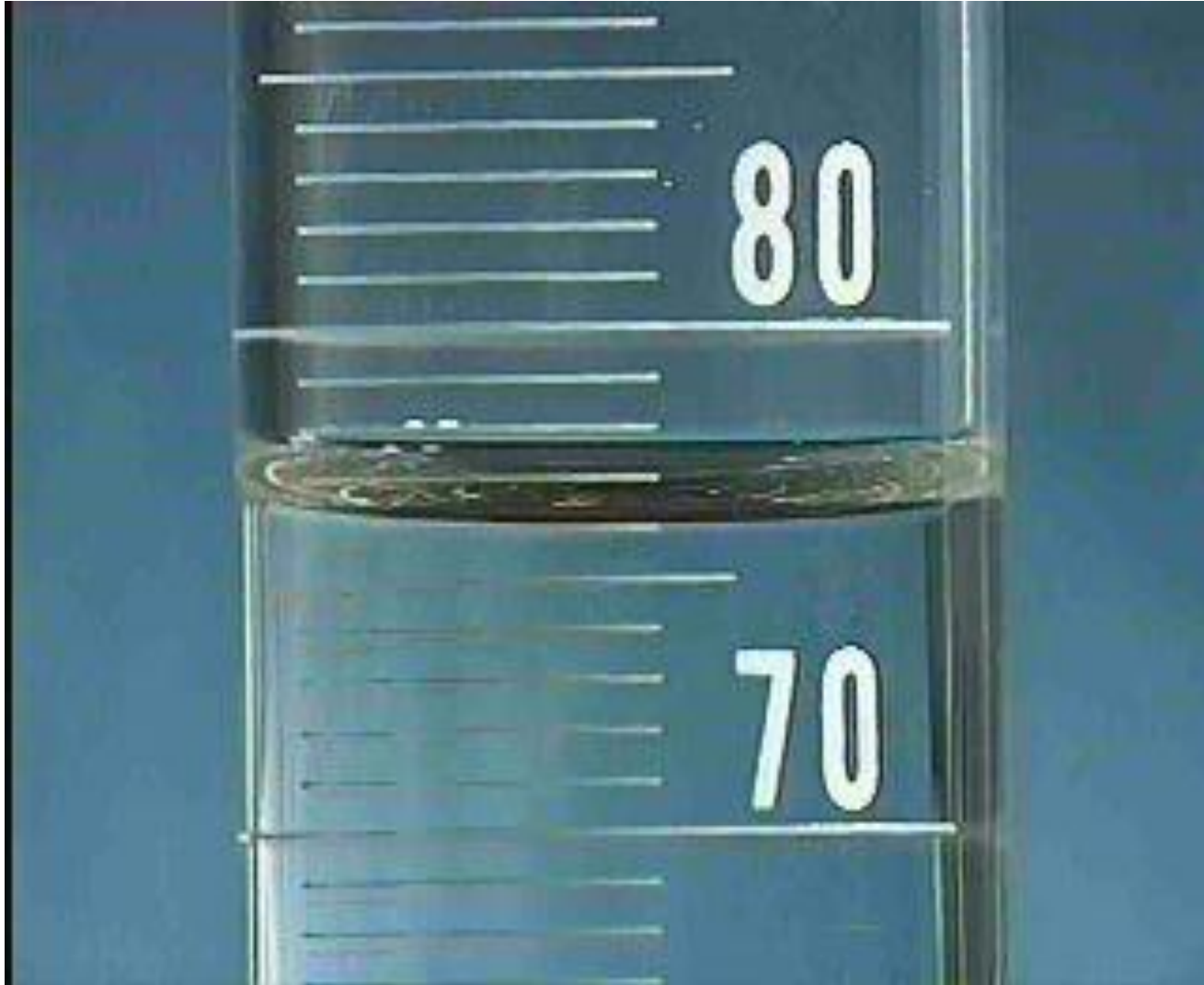


What is the volume here?

What's the increment?



Lets Practice reading a graduated cylinder:



What is  
the  
volume  
here?

# Lets Practice reading a graduated cylinder:



- What is the increment of this graduated cylinder?
- What is the volume?

# Basic Terminology

*1 liter = 1000 milliliters*

*1 L = 1000 ml*

*a milliliter occupies the same amount  
of space as a cubic centimeter*

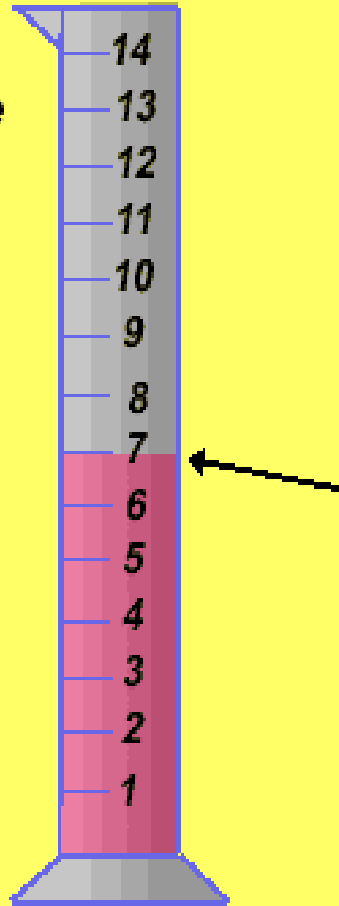
*1 mL = 1 cm<sup>3</sup>*

*or “cc” for short*



Lets Practice reading a graduated cylinder:

The graduate  
is marked  
off in  
equal units  
of volume



**Fill up your  
graduated  
cylinders about  $\frac{1}{2}$   
way**

Class

Work

Calculate  
the volume

# Deep Thinking Question...

- ❑ Can you measure 6 ml with a 100 ml graduated cylinder?
- ❑ Can you measure 129 ml with a 100 ml graduated cylinder?

# Lab- Now You Try

- ❑ 1. Fill up the graduated cylinder to ANY amount. Find the bottom of the meniscus. See if your partner agrees.
- ❑ 2. Choose a measurement, THEN try to fill the graduated cylinder to that exact amount.
- ❑ 3. Try steps # 1 and 2 with the 25 mL 10 mL graduated cylinder.

Home

Work

Internet Questions

**Work Sheet**

# Website for Extra Practice

- <http://www.wisc-online.com/objects/ViewObject.aspx?ID=GCH302>
- <http://morrisonlabs.com/meniscus.htm>

# Homework

- Single worksheet with graduated cylinders  
on it    **HW** \_\_\_\_\_

# Reading a Graduated Cylinder

Name \_\_\_\_\_

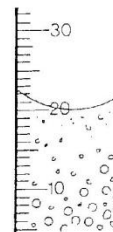
Small quantities of a liquid can be measured using a graduated cylinder. You may notice how the liquid curves up the side of the cylinder. To get an accurate reading, read the measurement at the bottom of the curve, or *meniscus*.

Read the following volumes.

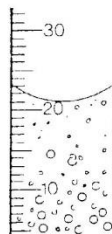
1. \_\_\_\_\_ ml



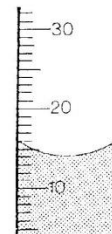
5. \_\_\_\_\_ ml



2. \_\_\_\_\_ ml



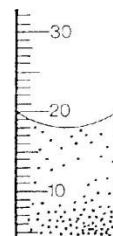
6. \_\_\_\_\_ ml



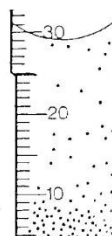
3. \_\_\_\_\_ ml



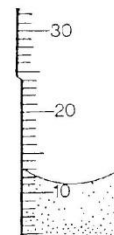
7. \_\_\_\_\_ ml



4. \_\_\_\_\_ ml



8. \_\_\_\_\_ ml



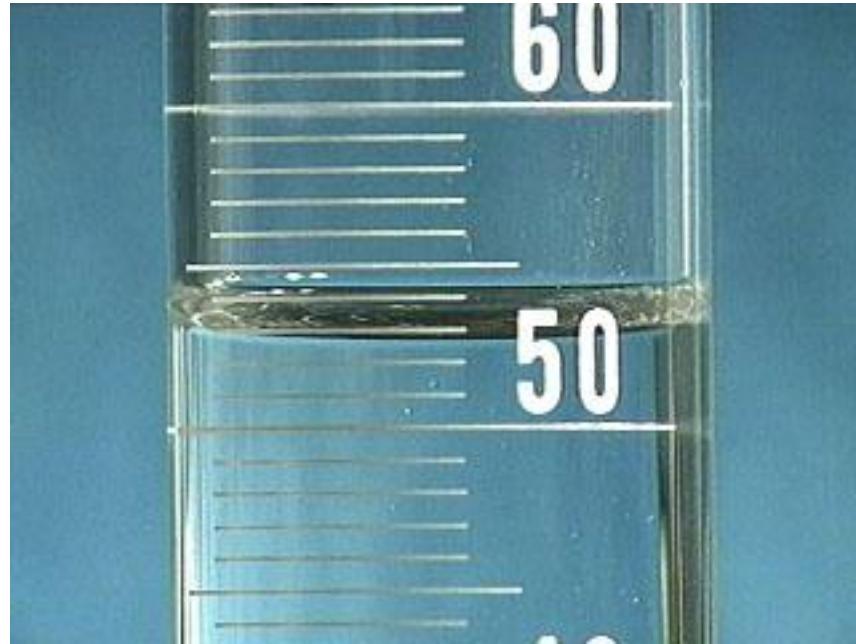


Page \_\_\_\_ in your spiral

BW

- If you are measuring the volume of a solid, what unit do you use to label?
- answer \_\_\_\_\_
- If you are measuring the volume of a liquid, what unit do you use to label?
- Answer \_\_\_\_\_

BW What is the accurate reading of this graduated cylinder? \_\_\_\_\_



# BW

- ❑ What is the correct way to measure using a graduated cylinder?
- ❑ [Click here for answer](#)

## Measuring Using A Graduated Cylinder

- Place cylinder on flat surface.
- Bend down at eye level.
- Read the bottom of the meniscus.
- Label your answer in mL.